

DOCKET NO: **28533US0PCT**

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
**MICHEL STREBELLE** : EXAMINER: **MICALI, JOSEPH**  
SERIAL NO: **10/567,263** :  
FILED: **FEBRUARY 6, 2006** : GROUP ART UNIT: **4181**  
FOR: **PROCESS FOR REGENERATING** :  
**A HYDROGENATION CATALYST**

DECLARATION OF MICHEL STREBELLE

SIR:

Now comes Michel Strebelle, who declares and states:

1. That I am the inventor of the above-identified patent application.
2. That the process described in the above-identified U.S. patent application relates to regenerating a spent hydrogenation catalyst containing at least one catalytic metal selected from Ru, Rh, Pd, Os, Ir and Pt on an inert support, where the spent catalyst has been used in a hydrogenation reaction of acetylene present in a gas mixture containing essentially of HCl, the HCl being obtained from the pyrolysis of 1,2-dichloroethane. The regeneration process described is essentially a thermal treatment of this particular spent hydrogenation catalyst in the presence of oxygen at a temperature of between 300 and 700°C.
3. As explained at specification page 1, in the production of vinyl chloride monomer, 1,2-dichloroethane is subjected to pyrolysis to form vinyl chloride monomer on the one hand, and HCl on the other. In the course of this pyrolysis a small amount of acetylene is also produced, but this acetylene is not easily separated from the HCl due to their very similar

volatilities. If this HCl is recycled to the oxychlorination, the trace of acetylene present therein is also recycled, and it gives rise to worthless by-products which are detrimental to the overall profitability of the process.

4. One known method for removing the acetylene from the HCl referred to in 3. above is by converting it into ethylene by hydrogenation in the presence of a catalyst. Once such catalyst is described in DE 24 38 153 which is described in detail at specification page 1, lines 20 ff, as is the difficulty in regenerating the particular spent catalyst at issue in this patent application. In addition, the specification cites an article by Mueller.

5. Both DE '153 and Mueller are publications of Degussa, the supplier of the catalyst E39H used in the example appearing in the specification at page 5, lines 10ff. Consistent with both DE '153 and Mueller, Solvay, my employer, received a letter from Degussa concerning this catalyst, its inactivation through use, and its possible regeneration. This letter specifically states "no catalyst regeneration possible", recommending instead replacement with fresh catalyst.

6. Contrary to this indication of nonregenerability, and as explained at specification page 1, lines 26ff, I have found, surprisingly, that the regeneration of the particular spent hydrogenation catalysts described in my application can be accomplished by thermal treatment in the presence of oxygen. This finding is completely surprising in view of the clear prior belief by others that it was not possible to regenerate such catalysts. The fact that thermal treatment has been used to regenerate other types of spent catalysts does not in any way predict or suggest that thermal treatment in oxygen would be successful in the regeneration of catalysts that have become spent by being used in a hydrogenation reaction of

acetylene present in a gas mixture consisting essentially of HCl that has been obtained from the pyrolysis of 1,2-dichloroethane.

7. It is my understanding that U.S. 2,368,507 to Welty has been cited in rejecting the claims to my invention. However, Welty does not discuss spent hydrogenation catalysts like those of my invention but, instead, relates to catalysts used in cracking, reforming, dehydrogenation, aromatization, and the like. See column 1, lines 1-7 of Welty. Thus, the Welty catalysts, when spent, are not those of my invention or those of DE '153. Because the catalysts of my invention and DE '153 are used in a different reactive environment, and for a completely different reaction (hydrogenation), as compared with the Welty catalysts, the materials and conditions responsible for the decrease in catalytic activity of the Welty catalysts, which must be reversed/removed in order to provide regeneration, are completely different from and unrelated to those of my invention and DE '153. Thus, what Welty describes in no way would suggest what I have done, even in combination with the contents of DE '153, as one would not expect to be able to apply the Welty teachings to the DE '153 catalysts due to the completely different reactions and reaction environments being discussed.

8. In my opinion the fact that I have succeeded in regenerating a specific type of spent hydrogenation catalyst that was clearly recognized in this field as being unregenerable is deserving of patent protection.

9. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believe to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under

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Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

10. Further deponent sayeth not.

*Strebelle*

Michel Strebelle

*March, 9<sup>th</sup> 2009*

Date